



Designation: G 170 – 01

Standard Guide for Evaluating and Qualifying Oilfield and Refinery Corrosion Inhibitors in the Laboratory¹

This standard is issued under the fixed designation G 170; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This guide covers some generally accepted laboratory methodologies that are used for evaluating corrosion inhibitors for oilfield and refinery applications in well defined flow conditions.

1.2 This guide does not cover detailed calculations and methods, but rather covers a range of approaches which have found application in inhibitor evaluation.

1.3 Only those methodologies that have found wide acceptance in inhibitor evaluation are considered in this guide.

1.4 This guide is intended to assist in the selection of methodologies that can be used for evaluating corrosion inhibitors.

1.5 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory requirements prior to use.*

2. Referenced Documents

2.1 ASTM Standards:

- D 1141 Practice for Preparation of Substitute Ocean Water²
- G 1 Practice for Preparing, Cleaning, and Evaluating Corrosion Test Specimens³
- G 3 Practice for Conventions Applicable to Electrochemical Measurements in Corrosion Testing³
- G 5 Reference Test Method for Making Potentiostatic and Potentiodynamic Anodic Polarization Measurements³
- G 15 Terminology Relating to Corrosion and Corrosion Testing³
- G 16 Guide for Applying Statistics to Analysis of Corrosion Data³
- G 31 Practice for Laboratory Immersion Corrosion Testing of Metals³
- G 46 Guide for Examination and Evaluation of Pitting Corrosion³
- G 59 Test Method for Conducting Potentiodynamic Polarization Resistance Measurements³

G 96 Guide for On-Line Monitoring of Corrosion in Plant Equipment (Electrical and Electrochemical Methods)³

G 102 Practice for Calculation of Corrosion Rates and Related Information from Electrochemical Measurements³

G 106 Practice for Verification of Algorithm and Equipment for Electrochemical Impedance Measurements³

G 111 Guide for Corrosion Tests in High Temperature or High Pressure Environment, or Both³

2.2 NACE Standards:⁴

NACE-5A195 State-of-the-Art Report on Controlled-Flow Laboratory Corrosion Test, Houston, TX, NACE International Publication, Item No. 24187, December 1995

NACE-ID196 Laboratory Test Methods for Evaluating Oil-Field Corrosion Inhibitors, Houston, TX, NACE International Publication, Item No. 24192, December 1996

NACE-TM0196 Standard Test Method “Chemical Resistance of Polymeric Materials by Periodic Evaluation,” Houston, TX, NACE International Publication, Item No. 21226, 1996

2.3 ISO Standards:⁵

ISO 696 Surface Active Agents — Measurements of Foaming Power Modified Ross-Miles Method

ISO 6614 Petroleum Products — Determination of Water Separability of Petroleum Oils and Synthetic Fluids

3. Terminology

3.1 Definitions of Terms Specific to This Standard:

3.1.1 *atmospheric pressure experiment*—an experiment conducted at the ambient atmospheric pressure (typically less than 0.07 MPa (10 psig)), using normal laboratory glassware.

3.1.2 *batch inhibitor*—an inhibitor that forms a film on the metal surface that persists to effect inhibition.

3.1.3 *batch treatment*—a method of applying a batch inhibitor. Batch inhibitors are applied as a plug between pigs or as slugs of chemical poured down the well bore. The batch inhibitor is dissolved or dispersed in a medium, usually hydrocarbon and the inhibited solution is allowed to be in contact with the surface that is to be protected for a fixed amount of time. During this period, the inhibitor film is formed on the surface and protects the surface during the passage of

¹ This guide is under the jurisdiction of ASTM Committee G01 on Corrosion of Metals and is the direct responsibility of Subcommittee G01.05 on Laboratory Corrosion Tests.

Current edition approved June 10, 2001. Published September 2001.

² *Annual Book of ASTM Standards*, Vol 11.02.

³ *Annual Book of ASTM Standards*, Vol 03.02.

⁴ Available from National Assoc. of Corrosion Engineers, P.O. Box 218340, Houston, TX 77218.

⁵ Available from American National Standards Institute, 11 West 42nd Street, 13th Floor, New York, NY 10036.